CITY OF HOUSTON
FIRE PREVENTION BUREAU
HOUSTON FIRE DEPARTMENT

LIFE SAFETY BUREAU (LSB) STANDARD 02

INSPECTION AND TESTING OF FIRE PROTECTION AND LIFE-SAFETY EQUIPMENT

SUPERCEDES: **HFD STANDARD 10-1 Rev. 1 (3/07/01)**

APPROVED BY: _____

DANIEL H. PRUITT
ASSISTANT FIRE MARSHAL

DATE: 5-23-03

APPROVED BY: _____

E. A. CORRAL
FIRE MARSHAL

DATE: 5-25-03

APPROVED BY: _____

CHRIS CONNEALY
FIRE CHIEF

DATE: 5-28-03

LIFE SAFETY BUREAU (LSB) STANDARDS ARE ESTABLISHED IN ACCORDANCE WITH PROVISIONS OF THE CITY OF HOUSTON FIRE CODE. THEY ARE SUBJECT TO THE ADMINISTRATIVE SECTIONS COVERING – ALTERNATIVE MATERIALS AND METHODS, MODIFICATIONS, AND BOARD OF APPEALS.

LSB STANDARD 02

INSPECTION AND TESTING OF FIRE PROTECTION AND LIFE-SAFETY EQUIPMENT

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LSB STANDARD 02

INSPECTION AND TESTING OF FIRE PROTECTION AND LIFE-SAFETY EQUIPMENT

SECTION 1 --- GENERAL

1.1 Scope.
Fire protection and life-safety equipment and systems shall be inspected, tested and maintained in all occupancies and locations where required or installed, as set forth in the City of Houston *Fire Code*, and as may be required by the Fire Marshal.

The provisions of this standard apply to the inspection, maintenance, and testing of both fire protection and life-safety systems and equipment. The requirements presented in this standard are to be considered as a **minimum**.

1.2 Purpose.
This standard is for the use and guidance of persons charged with installing, servicing, and maintaining fire protection and life safety equipment in a state of operational readiness and reliability. The fire protection and life-safety requirements of this standard are general in nature and are not intended to override the specific requirements of manufacturers, other City of Houston, state or federal regulatory agencies standards for specific occupancies. Where there is a conflict between a general requirement of this standard and a specific requirement of a nationally recognized standard, LSB Standard 02 shall apply.

This standard is subject to periodic review and updates, to accommodate changes in local need or requirement, or change in nationally recognized standards, in related technology, or where required by state or federal regulation.

1.3 Responsibility.
It shall be the responsibility of the owner or owner's agent of occupancies that contain fire protection and life-safety equipment and systems, to have such inspected, tested and maintained. It shall be the owner or occupant's responsibility to provide ready accessibility to components of the fire protection and life-safety equipment and systems that require inspection, testing and maintenance in accordance with this standard.

SECTION 2 --- DEFINITIONS

2.1 Fire Protection equipment and systems.
Specially designed equipment, which either alone or as a system, provided to assist in the extinguishment of fire, and to limit the spread of fire and smoke, either by automatic, semi-automatic or manual means. This includes, but is not limited to: portable fire extinguishers; fire hoses; fire pumps; wet and dry standpipe systems; automatic sprinkler systems; clean agent fire extinguishing systems and other special extinguishing systems; fire doors and dampers; and other fire-protection systems and appurtenances.

2.2 Life-Safety equipment and systems.
Specially designed equipment, that either alone or as a system, provided to assist in the preservation of human life in exiting from an emergency event, or to assist in the location, confinement and successful conclusion of an event, either through automatic, semi-automatic or manual means. This includes, but is not limited to: fire alarm systems; stairway pressurization and smoke-removal systems; smoke and heat ventilators; and emergency power supply and lighting systems.

2.3 Inspection.
A "quick check" that a fire protection or life-safety system is available and will operate. It is intended to give reasonable assurance that the equipment will be operable in the proper manner that it was designed or installed for. This is done by seeing that it is in its designated place, that it has not been removed or tampered with, and that there is no obvious physical damage or condition to prevent its operation.

2.4 Maintenance.
A thorough examination of the fire protection or life-safety system's equipment. It is intended to give maximum assurance that the equipment will operate effectively and safely. It includes a thorough examination and any necessary repair or replacement. It will normally reveal if other testing, repair or modification is required.

2.5 Servicing.
Includes one or more of the following: (1) maintenance, (2) minor repair, and (3) routine on-site testing.

SECTION 3 ----- GENERAL REQUIREMENTS

3.1 Servicing, testing, and maintenance.
Qualified personnel approved by the Fire Marshal shall conduct all servicing, testing, repair, maintenance and tagging of fire protection and life-safety equipment. Approved automatic fire sprinkler, fire alarm and fire extinguisher service companies are those licensed by the State of Texas. Personnel not licensed, certified, or approved by City of Houston or State of Texas, may be required to provide documentation of licensing or certification by similar approved agencies or authorities, or identification as manufacturer's representative or authorized service personnel. All reference to the servicing, testing or maintenance of equipment that involves live electrical circuits, currents or equipment, shall be done in compliance with the City of Houston *Electrical Code.*

3.2 Service tags.
After installation or service by an approved service company, and where required, an approved service tag shall be completed in detail indicating all work that has been performed and then the tag attached to the equipment or system in such a position as to permit convenient inspection and not hamper its actuation or operation. A new service tag must be attached each time service is performed.

> **RED TAG** – If impairments to the system constitute emergency impairments as defined in applicable NFPA Standards, then a completed 'Red' tag shall be attached indicating the date and nature of the impairment or what corrective action is necessary. The Fire Marshal's office shall be notified, as soon as possible, whenever fire protection or life-safety equipment is RED TAGGED.
>
> **YELLOW TAG –** If the equipment or system is found not to be in compliance with applicable NFPA Standards or manufacturer's guidelines, a completed yellow tag must be attached to indicate what corrective action is necessary.
>
> **GREEN TAG –** System is in proper repair, without impairment, and should with reasonable assurance function as required for full service.

Service tags may be removed only by an authorized employee/agent of an approved firm that has corrected the conditions and certified the service, an employee of the state fire marshal's office, or a representative of the authority having jurisdiction.

3.3 New Installation.
All new installations of fire protection equipment and fire alarms systems shall have affixed a service tag in addition to any required installation acceptance tags.

3.4 Upgrade of equipment.
All fire protection and life-safety equipment shall be maintained in accordance with requirements of the manufacturer, and local, state, federal or nationally recognized standards in effect at the time of original installation and acceptance, unless otherwise required by the *Fire Code, Building Code* or *City Ordinance*, or by the Fire Marshal or other regulatory agencies.

3.5 Inspection and maintenance records.
All logs or records of inspection, testing, maintenance and major repairs of fire protection and life-safety equipment and systems shall be maintained on file for not less than **3 years**, and made available to fire department upon request.

3.6 Notification of systems out of service.
Houston Fire Department Emergency Communications Center shall be immediately notified by telephone, at **713-222–7643**, whenever a required fire protection or life-safety system is placed out of service for emergency or non-scheduled repairs, replacement, or service. The fire department shall again be notified when the system is restored to normal operational status.

The Fire Marshal's office shall be notified, **in writing**, not less than 7 business days prior to any lengthy routine or scheduled repairs, or replacement time period. Notification shall be prior to, when possible, placing the system out of service. Certification and documentation of repairs and operational readiness of the system shall be provided to the Fire Marshal upon request.

No fire protection or life-safety equipment or system prescribed by the *Fire Code* or *Building Code* shall be placed permanently out of service unless prior written approval is obtained from the Fire Marshal.

SECTION 4 ----- LIFE-SAFETY SYSTEMS

4.1 FIRE ALARM SYSTEMS

4.1.1 General.
Fire alarm systems shall be tested, and service tagged at the main alarm panel, not less than **annually**. Testing shall include all smoke detectors, manual pull devices, annunciators, visual indicators and strobes, control units, voice/alarm communications systems and other devices that may be part of the fire alarm system.

Exceptions: 1. Heat and flame detection devices shall be tested in accordance with manufacturer's guidelines.

2. Hazardous vapors release detection alarm systems shall be tested in accordance with manufacturer's guidelines.

3. Where an approved electronic exit egress locking device is installed on an exit egress door, in accordance with the *Building Code*, the fire alarm system, relay devices to locking device and at the door shall be tested at least **semi-annually** to ensure fail-safe operation of the relay and locking device.

4.1.2 Test of systems.
A licensed fire alarm service company shall test the fire alarm system. Testing and maintenance shall be in accordance with NFPA 72. Test of the system shall include operation of all auxiliary functions of the alarm system including, but not limited to: electronic exit egress control devices, automatic fire and

smoke door closing, fire and smoke damper function, elevator recall, stair pressurization operation and HVAC shutdown. Written documentation shall be provided that all equipment functioned in accordance with NFPA 72 or in an approved fail-safe mode.

4.1.3 Audibility testing. A licensed fire alarm service company shall do test of all of the fire alarm system annunciator devices not less than **every 3 years**. Written documentation shall be provided that audibility meets requirements as set forth in NFPA 72.

4.2 EMERGENCY LIGHTING SYSTEMS

4.2.1 General.
Provide for the testing of emergency lighting systems that are part of an approved exit system and shall include, but is not limited to: lighted exit signs, stairway lighting, and egress lighting, where required both inside and outside of a building or structure.

4.2.2 Generator systems.
'Run Check' of the generator unit shall be performed at least **monthly**, for a period of at least **30 minutes**, under load conditions. System shall be checked for proper fuel, oil and coolant levels prior to starting test. Authorized building or contract personnel may perform 'Run Checks' and maintenance. All testing should be done in accordance with manufacturer's recommendations and instruction manuals and NFPA 110. A written record of monthly test shall be maintained.

4.2.3 Battery systems.
Battery units shall be inspected **quarterly.** Authorized building or contract personnel may perform inspections, using procedures in accordance with manufacturer's guidelines, *Electrical Code* Section 700-4 (c) and NFPA 110. A written record of inspections shall be maintained.

4.2.4 Test of systems.
An approved licensed master electrician or licensed electrical service company shall test all emergency lighting systems annually. The battery units, whether of the acid or alkali type, shall be tested continuously for a minimum of **90 minutes**. Generator units shall be tested in accordance with Section 4.3.2 of this standard. Any failures shall be repaired or replaced as soon as possible. Written documentation of testing and results, and repairs/replacements, shall be provided on all equipment.

4.3 EMERGENCY POWER SUPPLY SYSTEMS (EPSS)

4.3.1 General.
Provide for the testing of required emergency power supply systems. EPSS shall be maintained to ensue to a reasonable degree that the system is capable of supplying service within the time specified for the type and for the time duration specified the its class. These systems provide emergency power for continuous operation of, but are not limited to: exit egress lighting systems, fire detection and alarm systems, public safety communications systems, fire pumps, stair pressurization and smoke removal systems, designated elevators, and associated electrical transfer switch gear.

4.3.2 Engine driven generator systems.
An authorized generator service company shall conduct an **annual 'Load Test'** with the available EPSS load and supplemental loads at **25 percent** of nameplate rating for **30 minutes**, followed by **50 percent** of nameplate rating for **30 minutes**, followed by **75 percent** of nameplate rating for **60 minutes** for a **total of 2 continuous hours**. Load test shall include complete "cold starts".

Elevator recall and firefighter control operations shall be checked, but need not be continuous for the test period. Fire pump starting loads shall be checked, but pumps need not run continuously for the test period.

Where the EPS is a paralleled multi-unit system, each unit shall be permitted to be tested individually at its rating.

Routine monthly testing and maintenance shall be performed in accordance with manufacturer's guidelines and NFPA 110.

4.3.3 Automatic Transfer Switch test. A test shall be provided on each automatic transfer switch that simulates failure of the primary electrical power source and the transfer of the load to the EPS. An approved independent licensed master electrician or licensed electrical service company shall check proper operation of all automatic transfer switches and required devices on emergency circuit(s). Written documentation of test results shall be provided, including any repairs required and not completed.

4.3.4 Manual operation of Transfer Switch. Instruction and equipment shall be provided for safe manual nonelectric transfer in event of automatic transfer switch malfunction. Manual transfer shall be exercised only by properly instructed personnel and in accordance with the *Electrical Code* and NFPA 110.

4.3.5 Lead-acid battery systems.
An approved independent licensed master electrician or licensed electrical service company qualified to test lead-acid battery systems shall perform an **annual 'Load Test'** of the complete EPSS. Load test shall be performed for a continuous period of not less than **90 minutes** or the documented time period recommended by the system's manufacturer. All required switches and equipment on the emergency circuit(s) should be operational for the duration of the test.

4.4 SMOKE CONTROL SYSTEMS

4.4.1 Test of systems.
Smoke control systems (Stair pressurization and smoke removal systems) shall be inspected, and tested not less than **every 5 years**, in accordance with City of Houston *Building Code* and *Mechanical Code* specifications in effect at time of system's installation and acceptance. Operational testing shall include all equipment such as initiating devices, fans, controls, doors and windows. System shall also be tested under standby power conditions. An approved licensed mechanical or HVAC contractor shall perform and document the test. (See Appendix B, Table 4-1)

4.4.2 Test of automatic fans and dampers.
Operational test of all automatic fans and dampers connected to building fire alarm system shall be tested **annually,** in conjunction with fire alarm system tests. Results shall be included with the fire alarm system inspection and test reports.

SECTION 5 ---- WATER BASED FIRE PROTECTION SYSTEMS

5.1 AUTOMATIC WET-PIPE SPRINKLER SYSTEMS

5.1.1 Routine inspection
Approved contract personnel or building personnel, fully trained to perform such inspections or checks, may perform routine visual inspections and equipment checks in accordance with NFPA 25. A written record of **monthly** and **quarterly** inspections of system components shall be maintained.

5.1.2 Test of systems
Automatic wet-pipe sprinkler system(s) shall be tested **quarterly,** fully inspected **annually** in accordance with NFPA 25, and service tagged at least **annually** by a licensed automatic fire sprinkler service company.

5.2 AUTOMATIC DRY-PIPE SPRINKLER SYSTEMS

5.2.1 Routine inspection
Contract personnel or approved building personnel, fully trained to perform such inspections or checks, may perform routine visual inspections and equipment checks in accordance with NFPA 25. A written record of **quarterly** inspections of system components shall be maintained.

5.2.2 Test of systems
All automatic dry-pipe sprinkler systems shall be tested **annually** in accordance with NFPA 25 and state requirements, and service tagged by an licensed automatic fire sprinkler service company.

5.2.3 Trip Tests
'Trip Test' of all dry-pipe valves shall be performed in accordance with NFPA 25.

1. **Partial 'Trip Test'** - shall be performed **annually**.
2. **Full 'Trip Test'** - shall be conducted at least **every 3 years**.

5.3 STANDPIPE SYSTEMS

5.3.1 General
Provide for the inspection, testing, and service tagging of wet and dry standpipe systems, hose connections pressure reducing valves and hose connection pressure reducing devices.

5.3.2 Wet Standpipe system
Standpipe systems that contain water in the piping at all times. A flow test shall be conducted for each zone of the standpipe system **every 5 years**. An approved service company shall conduct flow tests with required volume of water at the system's design pressure and provide required service tagging of the system at the main control valves and risers. Testing shall be conducted in accordance with NFPA 25.

5.3.3 Dry Standpipe system
Standpipe systems that do not normally contain water in the piping and have to be supplied with water from an outside source. An approved service company performing such testing shall conduct hydrostatic test on the standpipe system **every 5 years**. System shall be tested with a pressure of not less than 200 psig for 2 hours or at 50 psig over the maximum designed working pressure of the system. Required service tagging of the system at the main control valves and risers shall be provided. Testing shall be conducted in accordance with NFPA 25.

5.3.4 Hose Connection Valves
All hose connection valve assemblies shall be fully cycled (open, close) at least **every 5 years**, to check for valve seizure, broken steams, leakage or other conditions that might impair proper operation of the valves. Valves that are not pressure regulated and have water pressure at greater than 150 psig, shall have approved signs on or adjacent to the valves identifying them as **HIGH PRESSURE** valves. Testing shall be conducted in accordance with NFPA 25.

> **Exception:** Pressure Reducing Devices and Pressure Regulating Valves in accordance with this Standard.

5.3.5 Hose Connection Pressure Regulating Valves
Flow tests and service tagging shall be conducted by an approved service company on all hose connection pressure regulating valves (PRV) **every 5 years**, and shall be in accordance with the manufacturer's guidelines and NFPA 25. Flow pressures should be maintained between 65 psig to 100 psig.

> **Exception:** In buildings that are 100 percent sprinklered, test **10 percent** of all valves on the system **annually**; if any failures, all remaining untested valves on system shall be tested. A written record shall be maintained on which devices have been tested and approved.

5.3.6 Hose Connection Pressure Reducing Devices
Hose connections valves and hose rack assembly pressure valves having pressure reducing devices (PRD), such as washer-type flow restrictors, shall be inspected **annually** by an approved service company to verify that the devices are in place. This inspection may be in conjunction with annual fire hose servicing and tagging. Flow tests shall be conducted **every 5 years** to verify correct flow and pressures, between 65 psig to 100 psig, are provided **at each valve**. Testing shall be conducted in accordance with NFPA 25.

5.3.7 Hose Rack Assembly Pressure Regulating Valves
Flow tests and service tagging shall be conducted by an approved service company on all hose rack assembly pressure-regulating valves **every 5 years**, and shall be in accordance with the manufacturer's guidelines and NFPA. 25. Flow pressures should be maintained between 65 psig to 100 psig.

5.4 FIRE DEPARTMENT CONNECTIONS

5.4.1 Inspection.
Fire department connections (FDC) shall be inspected **quarterly** by building personnel in accordance with this standard and NFPA 25. Inspections should check for: missing protective caps or covers, damaged hose couplings, couplings not operating freely, missing or deteriorated coupling thread gaskets, the presence of foreign material that might interfere with operation of system, water in the piping that could indicate possible check valve leaks, and missing standpipe or sprinkler connection identification signs. A written record of all quarterly inspections should be maintained.

5.4.2 Tests.
A licensed service company shall conduct hydrostatic and flow tests of all fire department connections, piping and check valve assemblies, not less than **every 5 years** (Testing shall be conducted in conjunction with the standpipe system 5-year test). In accordance with this standard, private fire main piping system from the FDC up to the sprinkler system riser(s) control valve(s), shall be hydrostatically tested with a pressure of not less than 200 psig for two hours, or at 50 psig over maximum designed working pressure of the system. Where FDC serve a standpipe system only, testing shall be conducted in accordance with the requirements for standpipe systems as set forth in Section 5.3 of this standard.

5.4.3 Signs.
Approved signs of weather-resistant materials, with not less than one inch (25mm) high legible block lettering on a highly contrasting background, shall be placed on or immediately adjacent to all fire department connections and provide the following information:

1. Type of system – STANDPIPE, SPRINKLER, STANDPIPE / SPRINKLER, DRY PIPE SPRINKLER, etc.
2. Which building or structure, or what portion, zone, and floors of the building or structure the FDC serve.

   Ex: Floors B1 – 12; Levels 1 – 8; High Zone Flr 21 – 40; etc.

3. On standpipe and combination standpipe/sprinkler systems - whether there are pressure regulating valves (PRV) or pressure reducing devices (PRD) on the system. Where a standpipe system has pressure regulating valves (PRV), the system pressure shall also be indicated.

   Example: NO PRV/PRD; PRD Levels 1 – 7 (System Pres. 150 PSI);
   PRV Floors 1 – 10 (System Pres. 175 PSI); etc.

5.5 FIRE PUMPS

5.5.1 Diesel engine driven pumps.

Operating test of diesel engine driven fire pumps shall be conducted **weekly** without water flowing. This test shall be conducted by allowing automatic starting of the pump to occur, and the pump shall be run a minimum of **30 minutes**. Run test may be performed by authorized building or contract personnel and shall be in accordance with the manufacturer's guidelines and NFPA 25. A written record of all weekly tests shall be maintained.

5.5.2 Electrically driven pumps.

Operating test of electrical motor driven fire pumps shall be conducted **weekly** without water flowing. This test shall be conducted by allowing automatic starting of the pump to occur, and the pump shall be run a minimum of **10 minutes**. This test may be performed by authorized building or contract personnel and shall be in accordance with the manufacturer's guidelines and NFPA 25. A written record of all weekly tests shall be maintained.

5.5.3 Fire Pump tests.

A flow test at pressure shall be conducted on fire pumps **annually**, recording churn, pump rated flow and 150 percent rated flow. Flow tests shall be performed by an approved service company in accordance with manufacturer's guidelines and NFPA 25, and service tags shall be provided in accordance with this standard. Fire pumps not meeting pump nameplate data shall be reported to the facility owner.

5.6 WATER SUPPLIES

5.6.1 Gravity tanks.

Periodic inspections by approved building personnel should be conducted in accordance with NFPA 25. A written record of inspections should be maintained.

An approved service company shall flow test gravity tank and piping systems, and perform an interior inspection at least **every 5 years**, in accordance with NFPA 25, and provide a written report of the inspection findings.

5.6.2 Water storage tanks.

Periodic inspections by approved building personnel should be conducted in accordance with NFPA 25. The tank shall be maintained full or at the designed water level. Sediment shall be drained or flushed from the tank **semiannually.**

An approved service company shall flow test water tanks and piping systems, and perform an interior inspection at least **every 5 years**, in accordance with NFPA 25, and provide a written report of the inspection findings.

Exception: Pressure tanks shall have interior inspection performed at least **every 3 years**.

Suction inlets and piping supplied from surface or subsurface sources, other than approved gravity and water supply tanks, should be inspected periodically by authorized building or contract personnel, to insure that inlet screens and piping are not obstructed or restricted so as to reduce required fire flows.

5.6.3 Private Fire Hydrants.
Private dry barrel and wet barrel fire hydrants, and wall hydrants, installed for fire department use shall be inspected and flow tested by an approved service company **annually**. Testing shall be conducted in accordance with NFPA 25, and a written report of the test findings and deficiencies shall be provided.

SECTION 6 ---- STANDPIPE FIRE HOSE

6.1 Hose inspection.
Standpipe hose shall be inspected and service tagged **annually** by a licensed service company. Hoses shall be removed from their racks or reels, hose gaskets inspected - for presence, tight fit and lack of deterioration, hose connection valves checked – for thread damage, operating handle presence or damage, and the hoses re-racked, in accordance with NFPA 1962.

6.2 Pressure testing.
An licensed service company shall pressure test standpipe hose not less than **every 3 years**, in accordance with manufacturer's guidelines and NFPA Standard No. 1962.

Exceptions: 1. New hose shall be pressure tested after the 5th year of installation, then every 3 years thereafter.

2. Unlined fire hose shall be replaced with an approved lined fire hose when pressure testing is required.

SECTION 7 ---- FIRE DOORS AND DAMPERS

7.1 Fire door, shutter and window inspection.
Fire doors, shutters and windows shall be inspected at least **quarterly**. Inspections should include the following:

1. Guides and bearing should be well lubricated.

2. Doors normally held open by automatic closing devices shall be operated to assure their proper operation. Closing devices and coordinators shall be adjusted to assure that the doors close and latch properly. (Smoke control doors are generally not required to latch).

3. Tinclad and Kalamein doors should be inspected for dry rot.

4. Chains and cables shall be regularly inspected for excessive wear and stretching. Ropes, other non-approved chain, or cable replacements shall not be installed or used on fire doors.

5. Fusible links shall be checked for paint or other non-approved coating materials. Replace any painted or coated links.

6. Door rollers shall be checked for paint, dirt or grime buildup. Remove paint or buildup as necessary to assure that rollers will not bind.

7. Doors shall be checked for holes, windows, modifications or other damage that would violate their fire rating.

8. Doors, window or shutters shall be checked to see that they are free of any obstruction that could interfere with proper operations.

Inspections may be performed by authorized building or contract personnel and shall be in accordance with the manufacturer's guidelines and NFPA 80. A written record of all inspections shall be maintained.

7.2 Fire door testing.
At least **annually** all sliding and rolling fire doors, shutters and windows shall be allowed to close completely to check operations of the guides and rollers, and to make sure the doors have adequate clearance to close completely. Chains and cables should be adjusted as needed. An approved service company shall perform any required repairs of fire doors or assemblies. A written record of all inspections and repairs shall be maintained.

7.3 Fire and smoke damper inspections.
Each fire and smoke damper assembly in mechanical, electrical or air handler rooms and spaces, in firewalls or rated occupancy separation walls, or in floors, or part of a smoke evacuation system, shall be visually inspected at least **every 2 years** to verify that their operations are not obstructed or impaired. Authorized building or contract personnel may perform visual inspections. A written record of inspections shall be maintained. Any dampers that are not accessible for inspection shall be noted in the inspection report.

7.4 Damper testing.
An approved HVAC company shall conduct a full-function test and maintenance on all fire dampers at least **every 4 years**. All testing and maintenance shall be conducted in accordance with this standard, manufacture's guidelines and NFPA 90A and 92A. Testing shall include removal of fusible links (where applicable) to check that damper vanes, blades or shutters fully close and that latch mechanism (if provided) operate properly. Dampers should (where possible) be operated with normal system airflow to ensure that they close and are not held open by the airstreams.

> **Exceptions:** 1. Electrical and/or pneumatic operated fire smoke dampers shall be maintained, cycled and tested not less than **every 6 months.**
>
> 2. Ceiling (Radiation) dampers. (See Section 7.5)

7.5 Ceiling (Radiation) dampers.
Where large numbers of ceiling (radiation) dampers have been installed as integral part of a fire rated ceiling assembly, a minimum of **10 percent** of the total number of dampers per floor in multi-story, or per fire zone in single story occupancies, shall be performed **annually**. If any of the dampers tested fail, then all remaining dampers on that floor or fire area shall be tested that cycle. Testing shall be performed by approved HVAC company. Documentation of test results shall be maintained, including identification of which dampers have been tested in each cycle.

SECTION 8 ---- PORTABLE FIRE EXTINGUISHERS

8.1 Installation.
Portable fire extinguishers shall be provided and installed in accordance with LSB Standard 01, 'Installation and Maintenance of Portable Fire Extinguishers', and NFPA 10, 'Portable Fire Extinguishers'".

8.2 Fire Extinguisher Inspections.
Fire extinguishers shall be inspected and service tagged **annually** by a licensed fire protection equipment service company, or by facility personnel where approved by the Fire Marshal. Inspection and tagging of fire extinguishers shall be in accordance with the manufacturer's guidelines and NFPA 10, 'Portable Fire Extinguishers'.

> **Exception:** Where Group R-2 apartment units are provided with a 1-A, 10-B:C fire extinguisher in accordance with LSB Standard 01, the fire extinguishers in each unit need not be inspected nor tagged by a service company. These fire extinguisher should be periodically checked by the tenant to see that the gauge on the fire extinguisher shows it to be charged. Any tenant unit fire

extinguisher that shows a lose of pressure should be returned to property management and exchanged for one that indicates proper pressures.

8.3 Hydrostatic Testing.
Fire extinguishers shall have hydrostatic tests in accordance with the manufacturer's guidelines and NFPA 10, 'Portable Fire Extinguishers'. (See Appendix B, Table 8-1)

SECTION 9 ---- SPECIAL FIRE SUPPRESSION SYSTEMS

9.1 Commercial kitchen hood systems.
All vent hood fire suppression systems installed in commercial kitchens shall be inspected and service tagged not less than **every 6 months**, and after any activation of the system, by an approved fire protection equipment company. Inspections shall be in accordance with manufacturer's guidelines and NFPA 17 and 17A.

Additionally, all commercial kitchen vent hoods, exhaust ducts, exhaust fans and appurtenances shall be cleaned and inspected by approved personnel and in accordance with manufacturer's guideline, as often as necessary to insure against excess grease accumulations.

9.2 'Type K' portable fire extinguishers.
'Type K' portable fire extinguishers, installed for use in the protection of cooking areas within commercial kitchens, shall be inspected, tested, service tagged **annually** and maintained in accordance with manufacturer's guidelines and NFPA 10 and 17.

9.3 Fixed Dry Chemical extinguishing systems.
Fixed dry chemical extinguishing systems where installed for protection of, but not limited to, the following: dip tanks or process hazards as spray booths, chemical hood systems or laboratory hood systems; shall have an actuating test of the system performed (discharge of the agent is not required) and service tags affixed **every 6 months** by an licensed fire protection equipment service company. Inspections and testing shall be in accordance with manufacturer's guidelines and NFPA 17.

9.4 Fixed Wet Chemical extinguishing systems.
Fixed wet chemical extinguishing systems where installed for protection of, but not limited to, the following: dip tanks or process hazards as spray booths, chemical hood systems or laboratory hood systems; shall have an actuating test of the system performed (discharge of the agent is not required) and service tags affixed **every 6 months** by an licensed fire protection equipment company. Inspections and testing shall be in accordance with manufacturer's guidelines and NFPA 17A.

9.5 Water Mist extinguishing systems.
Water Mist extinguishing systems should be inspected and tested and service tags affixed **annually** by an licensed fire protection equipment company, in accordance with manufacturer's guidelines and NFPA 750.

9.6 Total flooding systems.
Enclosure integrity for total flooding systems shall be verified **annually** by an licensed fire protection equipment company, using approved blower fan pressurization units, to locate and seal any significant air leaks that could cause failure to hold specific agent concentrations levels. Documentation of enclosure integrity testing and results shall be maintained.

9.6.1 Carbon Dioxide extinguishing systems.

Carbon Dioxide extinguishing systems shall be inspected and tested, and service tags affixed **annually** by an licensed fire protection equipment company, in accordance with manufacturer's guidelines and NFPA 12.

9.6.2 Halon 1301 extinguishing systems.
Halon 1301extinguishing systems shall be inspected and tested, and service tags affixed **annually** by an licensed fire protection equipment company, in accordance with manufacturer's guidelines and NFPA 12A.

9.6.3 Clean Agent extinguishing systems.
Clean Agent extinguishing systems shall be inspected and tested, and service tags affixed at least **every 6 months** by an licensed fire protection equipment company, in accordance with manufacturer's guidelines and NFPA 2001.

APPENDIX A - ADDITIONAL TESTING REQUIREMENTS

SECTION 1 ---- NATURAL GAS PIPING LEAKAGE TEST

1.1 Where required.
All Assembly, Educational, Institutional and Group R-1 and R-2 Residential (hotels and apartment houses) occupancies shall have a test of the building's natural gas system(s), to check for leakage, at least **every 5 years**.

> **Exceptions:** 1. Facilities where **annual** tests are required by state or other regulatory agencies.
>
> 2. Gas tests may be required by the Fire Marshal in **any** occupancy where it is suspected or believed that a gas leak or related hazard exists.

1.2 Permits.
All gas pressure tests require permitting by the City of Houston *Planning and Development Department* - Building Inspection Division. 'Gas Test' permits shall be obtained, and gas pressure tests conducted, by a licensed plumber or approved gas equipment service company. Copies of the City of Houston *Planning and Development*, 'Gas Test' Permit and final approval form shall be obtained from the plumber or service company and maintained on the premises. Permitting and testing information may be obtained from the City of Houston *Planning and Development Department*, Building Inspection Division, Plumbing Section.

SECTION 2 ---- BOILER INSPECTIONS

2.1 Inspections.
Inspection of building's boiler systems shall be in accordance with City of Houston *Planning and Development Department*, Building Inspection Division and state regulatory agencies as to requirements and frequencies. Approved boiler permits shall be maintained on premises.

2.2 Gas system leakage test.
Gas supply systems for boilers within any occupancy shall be subject to periodic inspections and tests in accordance with Section 1 of this appendix.

SECTION 3 ---- ELEVATOR INSPECTIONS

3.1 Inspection and permits.
All elevators, man-lifts and hoistway lifts shall be inspected in accordance with requirements set forth by the City of Houston *Planning and Development Department* and state regulatory agencies. Elevator inspection reports should certify the proper operation of automatic recall, firefighter control, and elevator car emergency phone or address system. Care should be given to insuring the legibility of the RED bevel ring around each car's fire fighter key switch. Inspection reports shall be maintained on premises.

Elevator Inspection permit information may be obtained from the City of Houston *Planning and Development Department* and the elevator inspection shall be conducted by an approved elevator service company.

3.2 Elevator switch keys.
A uniform switch key, that are not part of a building master key system, shall be provided for all elevators within a building or structure that is required to have approved Phase I "Elevator recall" and Phase II "In-car firefighter control" elevator controls. The uniform switch key shall function to operate the Phase I "elevator recall" and operate the Phase II "in-car firefighter operations". This uniform key may be a single key that will perform both functions, or two separate uniform keys. The uniform key or keys must

function with **all** the elevators in the building or structure. Copies of the uniform key(s) shall be kept on the premises in a location readily accessible to authorized personnel, but not where they are available to the public. For high-rise buildings, these keys shall be kept in the building's Fire Depository Key Box, and/or the Phase I" Recall Key", may be permanently connected to the elevator control panel when such panel is located within a building's Fire Command Center. Keys shall be properly labeled as to actual functions.

SECTION 4 ---- FIRE ESCAPE STAIRWAYS AND LADDERS

4.1 Inspection.

Fire escape stairway systems and ladders installed in accordance with the *Building Code*, shall be inspected **quarterly** by approved building or contract personnel, for signs of: severe rust damage; damaged or missing parts; loose anchorage; inoperative or damaged counterbalanced stairs; balcony, railing or step damage; obstructed access to and exiting from the escape stairway or ladder; and any hazardous conditions that would effect safe usage of the escape stairway or ladder.

4.2 Service and maintenance

When more thorough inspection, servicing or repairs are required for fire escapes, an approved mechanical engineering company shall perform it or company authorized to install and service fire escape systems. The Fire Marshal is authorized to require inspection and repair of, and/or a technical report on, any fire escape stairway or ladder that presents, or appears to present a hazard, as a component of a building's or structure's required exiting system. A written record of all quarterly inspections and repairs to the system shall be maintained.

In accordance with the *Building Code*, fire escape stairways and balconies shall support the dead load plus a live load of not less than 100 pounds per square foot. All stair and balcony railing shall support a horizontal force of not less than 50 pounds per linear foot of railing.

Fire escape ladders shall be designed and connected to the building to withstand a horizontal force of 100 pounds per linear foot and each rung shall support a concentrated weight load of 500 pounds placed anywhere on the rung.

APPENDIX B - TABLES

Table 4-1 - Stairwell pressurization requirements:

STAIRWELL PRESSURIZATION CODES FOR THE CITY OF HOUSTON				
		Prior to 12/23/81	**12/23/81 to 3/23/83**	**3/23/83 And after**
1.	Number of Doors Open	1	3	4
2.	Static Pressure Across Doors	0.05	0.05	----
3.	Ave. Velocity Across Doors (ft/min)	----	----	300
4.	Stair Pressure – Doors closed	----	----	0.15
5.	Maximum Force to Open Doors	25 lb.	25 lb.	35 lb.
6.	Maximum Door Closure Pressure	----	----	10 lb.
7.	Number Fans per Stairwell	1	1 or 2	2
8.	Fan Capacity	100%	50 or 100%	50%
9.	Fan Drive	----	Direct	Direct
10.	Fans on Emergency Power	Yes	Yes	Yes
11.	Supply Air Source	Outside Air	Outside Air	Outside Air
12.	Supply Air Inlets	1	2	2
13.	Supply Air Distribution	Stairwell	Chase	Chase
14.	Supply Air Outlet Spacing	----	3 Floors	3 Floors
15.	Supply Air Inlet Separation	----	50 ft Vertical	50 ft Vertical
16.	Fire Floor Exhaust	No	No	Yes
17.	Separation - Intake & Exhaust	----	----	20 ft
18.	Number of Exhaust Air Changes	---	---	6
19.	Stairwell leakage Rate	----	----	300 CFM/Floor at 0.3” S. P.
20.	Smoke Trap	No	No	Yes
21.	Doors Fully Open During Test	No	Yes	Yes

Table 8-1 - Fire extinguisher testing:

Fire Extinguisher Inspection, Test and Maintenance Summary

Extinguisher Type	Visual Inspection	Hydrostatic Test Interval - Years	Maintenance
Stored Pressure	Monthly	5	Annual
Wetting Agent	Monthly	5	Annual
Foam	Monthly	5	Annual
AFFF (aqueous film-forming foam)	Monthly	5	Annual
Dry Chemical	Monthly	5	Annual *
Carbon Dioxide	Monthly	5	Annual
Dry Chemical (stored pressure)	Monthly	12	Annual *
Dry Chemical (cartridge operated)	Monthly	12	Annual
Clean Agent	Monthly	12	Annual
Halon 1211	Monthly	12	Annual

* - Internal examinations not required for stored pressure dry chemical fire extinguishers

REFERENCES

1. City of Houston *Fire Code*, International Fire Code (IFC), 2000 edition, As amended.

2. Life Safety Bureau (LSB) Standard 01, "Installation and Maintenance of Fire Extinguishers ".

3. City of Houston *Building Codes*, all editions.

4. National Fire Protection Association (NFPA) Publication, "Fire Protection Systems – Inspection, Test & Maintenance Manual".

5. National Fire Protection Association (NFPA) Standard No. 10, "Portable Fire Extinguishers".

6. National Fire Protection Association (NFPA) Standard No. 12, "Carbon Dioxide Extinguishing Systems".

7. National Fire Protection Association (NFPA) Standard No. 12A, "Halon 1301 Fire Extinguishing Systems".

8. National Fire Protection Association (NFPA) Standard No. 17, "Dry Chemical Extinguishing Systems".

9. National Fire Protection Association (NFPA) Standard No. 17A, "Wet Chemical Extinguishing Systems".

10. National Fire Protection Association (NFPA) Standard No. 25, "Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems."

11. National Fire Protection Association (NFPA) Standard No. 70, "National Electrical Code".

12. National Fire Protection Association (NFPA) Standard No. 72, "National Fire Alarm Code".

13. National Fire Protection Association (NFPA) Standard No. 80, "Fire Doors and Windows".

14. National Fire Protection Association (NFPA) Standard No. 90A, "Installation of Air-Conditioning and Ventilating Systems".

15. National Fire Protection Association (NFPA) Standard No. 92A, "Smoke-Control Systems".

16. National Fire Protection Association (NFPA) Standard No. 110, "Emergency Power Supply Systems".

15. National Fire Protection Association (NFPA) Standard No. 750, "Water Mist Fire Protections Systems".

16. National Fire Protection Association (NFPA) Standard No. 1962, "Care, Use and Service Testing of Fire Hose, Including Couplings and Nozzles".

17. National Fire Protection Association (NFPA) Standard No. 2001, "Standard on Clean Agent Fire Extinguishing Systems".

18. American Society of Mechanical Engineers (ASME) Standard No. A17.3,"Safety Code for Elevators and Escalators", 1993 edition.

All reference materials shall be the most current published editions, unless otherwise indicated.